

**What Is Claimed Is:**

1       1. A transflective liquid crystal display (LCD) device  
2 with a single cell gap, comprising:  
3           a first substrate and a second substrate opposite thereto,  
4           wherein the transflective LCD device comprises a  
5           reflective region and a transmissive region;  
6           a plurality of first pixel electrodes and a plurality of  
7           second pixel electrodes on the first substrate, the  
8           first pixel electrodes in the reflective region and  
9           the second pixel electrodes in the transmissive  
10          region;  
11          a plurality of first common electrodes and a plurality of  
12           second common electrodes on an inner surface of the  
13           second substrate, the first common electrodes in the  
14           reflective region and the second common electrodes  
15           in the transmissive region;  
16          a vertically aligned liquid crystal layer interposed  
17           between the first substrate and the second  
18           substrate, wherein orientation of the vertically  
19           aligned liquid crystal layer is controlled by an  
20           electric field between the pixel and common  
21           electrodes;  
22          a first orientation control window having a slit width  
23           "S<sub>rc</sub>" between the first common electrodes in an area  
24           corresponding to each first pixel electrode and  
25           dividing the liquid crystal layer into a plurality  
26           of orientation sections; and  
27          a second orientation control window having a slit width  
28           "S<sub>tc</sub>" between the second common electrodes in an area

29               corresponding to each second pixel electrode and  
30               dividing the liquid crystal layer into a plurality  
31               of orientation sections;  
32               wherein a relationship between  $S_{rc}$  and  $S_{tc}$  satisfies  
33                $S_{rc} < S_{tc}$ .

1               2. The transreflective LCD device according to claim 1,  
2       wherein each first common electrode comprises an electrode  
3       width " $W_{rc}$ " and each second common electrode comprises an  
4       electrode width " $W_{tc}$ ", and a relationship between  $W_{rc}$  and  $W_{tc}$   
5       satisfies  $W_{rc} < W_{tc}$ .

1               3. The transreflective LCD device according to claim 1,  
2       further comprising:

3               a first opening having a slit width " $S_{rp}$ " between the first  
4       pixel electrodes in an area corresponding to each  
5       first common electrode; and

6               a second opening having a slit width " $S_{tp}$ " between the  
7       second pixel electrodes in an area corresponding to  
8       each second common electrode;

9               wherein a relationship between  $S_{rp}$  and  $S_{tp}$  satisfies  
10               $S_{rp} < S_{tp}$ .

1               4. The transreflective LCD device according to claim 2,  
2       wherein each first pixel electrode comprises an electrode width  
3       " $W_{rp}$ " and each second pixel electrode comprises an electrode  
4       width " $W_{tp}$ ", and a relationship between  $W_{rp}$  and  $W_{tp}$  satisfies  
5        $W_{rp} < W_{tp}$ .

1               5. The transreflective LCD device according to claim 1,  
2       wherein the slit width " $S_{rc}$ " of the first orientation control  
3       window ranges from 3μm to 7μm.

1       6. The transflective LCD device according to claim 1,  
2 wherein the slit width "S<sub>tc</sub>" of the second orientation control  
3 window ranges from 8μm to 12μm.

1       7. The transflective LCD device according to claim 2,  
2 wherein the electrode width "W<sub>rc</sub>" of each first common electrode  
3 ranges from 5μm to 15μm.

1       8. The transflective LCD device according to claim 2,  
2 wherein the electrode width "W<sub>tc</sub>" of each second common  
3 electrode ranges from 15μm to 25μm.

1       9. The transflective LCD device according to claim 3,  
2 wherein the slit width "S<sub>rp</sub>" of the first opening ranges from  
3 3μm to 7μm.

1       10. The transflective LCD device according to claim 3,  
2 wherein the slit width "S<sub>tp</sub>" of the second opening ranges from  
3 8μm to 12μm.

1       11. The transflective LCD device according to claim 4,  
2 wherein the electrode width "W<sub>rp</sub>" of each first pixel electrode  
3 ranges from 5μm to 15μm.

1       12. The transflective LCD device according to claim 4,  
2 wherein the electrode width "W<sub>tp</sub>" of each second pixel electrode  
3 ranges from 15μm to 25μm.

1       13. The transflective LCD device according to claim 1,  
2 further comprising a gap "d" between the pixel and common  
3 electrodes, ranging from 3μm to 5μm.

1       14. The transflective LCD device according to claim 1,  
2 wherein configuration of the first orientation control window  
3 and the second orientation control window is a straight striped  
4 pattern.

1       15. The transflective LCD device according to claim 1,  
2 wherein configuration of the first orientation control window  
3 and the second orientation control window is a wedge-shaped  
4 pattern.

1       16. The transflective LCD device according to claim 1,  
2 further comprising:

3           an insulating layer on the first substrate;  
4           a reflective layer on the insulating layer in the  
5           reflective region; and  
6           a transparent planarization layer on the reflective layer  
7           and the insulating layer;  
8           wherein a top surface of the insulating layer in the  
9           reflective region is higher than that in the  
10          transmissive region.

1       17. The transflective LCD device according to claim 1,  
2 further comprising:

3           an insulating layer on the first substrate;  
4           a reflective layer on the insulating layer in the  
5           reflective region; and  
6           a color filter on the reflective layer and the insulating  
7           layer;  
8           wherein a top surface of the insulating layer in the  
9           reflective region is higher than that in the  
10          transmissive region.

1        18. The transflective LCD device according to claim 3,  
2 wherein  $S_{rc}$  equals  $S_{rp}$  and  $S_{tc}$  equals  $S_{tp}$ .

1        19. The transflective LCD device according to claim 4,  
2 wherein  $W_{rc}$  equals  $W_{rp}$  and  $W_{tc}$  equals  $W_{tp}$ .

1        20. The transflective LCD device according to claim 3,  
2 wherein the first orientation control window faces a center  
3 part of each first pixel electrode, the second orientation  
4 control window faces a center part of each second pixel  
5 electrode, the first opening faces a center part of the first  
6 common electrode and the second opening faces a center part of  
7 the second common electrode.

1        21. A method of fabricating a transflective liquid  
2 crystal display device, comprising the steps of:

3        providing a first substrate and a second substrate  
4              opposite thereto, wherein the transflective LCD  
5              device has a reflective region and a transmissive  
6              region;

7        forming a reflective layer overlying the first substrate  
8              in the reflective region;

9        forming a transparent planarization layer or a color  
10              filter overlying the reflective layer and the first  
11              substrate;

12        forming a plurality of first pixel electrodes and a  
13              plurality of second pixel electrodes on the  
14              transparent planarization layer or the color  
15              filter, wherein the first pixel electrodes are  
16              located in the reflective region and the second  
17              pixel electrodes in the transmissive region;

18 forming a plurality of first common electrodes and a  
19 plurality of second common electrodes on an inner  
20 surface of the second substrate, wherein the first  
21 common electrodes are located in the reflective  
22 region and the second common electrodes in the  
23 transmissive region; and  
24 filling a space between the first substrate and the second  
25 substrate with liquid crystal molecules to form a  
26 vertically aligned liquid crystal layer interposed  
27 between the first substrate and the second  
28 substrate, wherein orientation of the vertically  
29 aligned liquid crystal layer is controlled by an  
30 electric field between the pixel and common  
31 electrodes;  
32 wherein a first orientation control window having a slit  
33 width "S<sub>rc</sub>" is formed between the first common  
34 electrodes in an area corresponding to each first  
35 pixel electrode, dividing the vertically aligned  
36 liquid crystal layer into a plurality of orientation  
37 sections;  
38 wherein a second orientation control window having a slit  
39 width "S<sub>tc</sub>" is formed between the second common  
40 electrodes in an area corresponding to each second  
41 pixel electrode, dividing the vertically aligned  
42 liquid crystal layer into a plurality of orientation  
43 sections;  
44 wherein a relationship between S<sub>rc</sub> and S<sub>tc</sub> satisfies  
45 S<sub>rc</sub><S<sub>tc</sub>.

1        22. The method according to claim 21, wherein each first  
2 common electrode has an electrode width "W<sub>rc</sub>" and each second  
3 common electrode an electrode width "W<sub>tc</sub>", and a relationship  
4 between W<sub>rc</sub> and W<sub>tc</sub> satisfies W<sub>rc</sub><W<sub>tc</sub>.

1        23. The method according to claim 21, further comprising  
2 the steps of:

3              forming a first opening having a slit width "S<sub>rp</sub>" between  
4              the first pixel electrodes in an area corresponding  
5              to each first common electrode; and  
6              forming a second opening having a slit width "S<sub>tp</sub>" between  
7              the second pixel electrodes in an area corresponding  
8              to each second common electrode;  
9              wherein a relationship between S<sub>rp</sub> and S<sub>tp</sub> satisfies  
10             S<sub>rp</sub><S<sub>tp</sub>.

1        24. The method according to claim 22, wherein each first  
2 pixel electrode has an electrode width "W<sub>rp</sub>" and each second  
3 pixel electrode an electrode width "W<sub>tp</sub>", and a relationship  
4 between W<sub>rp</sub> and W<sub>tp</sub> satisfies W<sub>rp</sub><W<sub>tp</sub>.

1        25. The method according to claim 21, wherein the slit  
2 width "S<sub>rc</sub>" of the first orientation control window ranges from  
3 3μm to 7μm.

1        26. The method according to claim 21, wherein the slit  
2 width "S<sub>tc</sub>" of the second orientation control window ranges from  
3 8μm to 12μm.

1        27. The method according to claim 22, wherein the  
2 electrode width "W<sub>rc</sub>" of each first common electrode ranges from  
3 5μm to 15μm.

1        28. The method according to claim 22, wherein the  
2 electrode width "W<sub>tc</sub>" of each second common electrode ranges  
3 from 15μm to 25μm.

1        29. The method according to claim 23, wherein the slit  
2 width "S<sub>rp</sub>" of the first opening ranges from 3μm to 7μm.

1        30. The method according to claim 23, wherein the slit  
2 width "S<sub>tp</sub>" of the second opening ranges from 8μm to 12μm.

1        31. The method according to claim 24, wherein the  
2 electrode width "W<sub>rp</sub>" of each first pixel electrode ranges from  
3 5μm to 15μm.

1        32. The method according to claim 24, wherein the  
2 electrode width "W<sub>tp</sub>" of each second pixel electrode ranges from  
3 15μm to 25μm.

1        33. The method according to claim 21, wherein a gap "d"  
2 is formed between the pixel and common electrodes, ranging from  
3 3μm to 5μm.

1        34. The method according to claim 21, wherein  
2 configuration of the first orientation control window and the  
3 second orientation control window is a straight striped  
4 pattern.

1        35. The method according to claim 21, wherein  
2 configuration of the first orientation control window and the  
3 second orientation control window is a wedge-shaped pattern.

1       36. The method according to claim 21, wherein the common  
2 electrodes are ITO (indium tin oxide) or IZO (indium zinc oxide)  
3 layers.

1       37. The method according to claim 21, wherein the pixel  
2 electrodes are ITO (indium tin oxide) or IZO (indium zinc oxide)  
3 layers.

1       38. The method according to claim 21, wherein the  
2 reflective layer is an aluminum or silver layer.

1       39. The method according to claim 21, wherein the  
2 transparent planarization layer is a SiO<sub>2</sub> layer.

1       40. The method according to claim 21, wherein the liquid  
2 crystal molecules are negative type ( $\Delta\epsilon < 0$ ).

1       41. The method according to claim 23, wherein S<sub>rc</sub> is equal  
2 to S<sub>rp</sub> and S<sub>tc</sub> equals S<sub>tp</sub>.

1       42. The method according to claim 24, wherein W<sub>rc</sub> is equal  
2 to W<sub>rp</sub> and W<sub>tc</sub> equals W<sub>tp</sub>.

1       43. The method according to claim 23, wherein the first  
2 orientation control window faces a center part of each first  
3 pixel electrode, the second orientation control window faces  
4 a center part of each second pixel electrode, the first opening  
5 faces a center part of the first common electrode and the second  
6 opening faces a center part of the second common electrode.

1       44. The method according to claim 21, wherein an  
2 insulating layer is formed on the first substrate before  
3 forming the reflective layer and a top surface of the insulating

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4 layer in the reflective region is higher than that in the  
5 transmissive region.